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ABSTRACT

This report to the Joint Dissemination Review Panel of the Office of Education and the National Institute of Education provides an overview of the Mother-Child Home Program of the Verbal Interaction Project: a voluntary, home-based early education program for low-income pre-preschoolers (2- and 3-year-old children), their mothers and other adults who provide primary nurturance for children. A brief program description specifies program goals, intended users and beneficiaries, the population sample used for program development and testing and salient program features. Also presented is evidence of program effectiveness in increasing mothers' positive verbal interactive behavior, facilitating children's cognitive development, influencing longitudinal (to third grade) cognitive, academic, and social-emotional development. The validity of the measures of program effectiveness is extensively discussed. Acceptance of the program by the target population is briefly indicated. Aspects of program replication in 70 settings in 16 states and Bermuda are indicated. Per dyad average annual costs for adoption and maintenance of the program are given. (Author/RH)

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MCHP/VIP: Mother-Child Home Program of the Verbal Interaction Project

SUBMISSION
FOR REVIEW BY THE
JOINT DISSEMINATION REVIEW PANEL
of

United States Office of Education/National Institute of Education

Reviewed and unanimously accepted by Panel November 27, 1978
at U. S. Office of Education, Washington, D. C.

PS 010419

SUBMISSION FOR REVIEW BY THE JOINT DISSEMINATION REVIEW PANEL

PROGRAM AREA: Early Childhood Education, Parent Readiness

I. TITLE OF PROGRAM: Mother-Child Home Program (MCHP)

II. DEVELOPED BY: Phyllis Levenstein, Ed.D., Director
Verbal Interaction Project, 5 Broadway, Freeport, New York 11520

III. FEDERAL SOURCES AND LEVELS OF FUNDING, 1967-1968:

U. S. Office of Education, 6/1/72 - 8/31/73:	\$ 65,325
National Institute of Mental Health, 9/1/70 - 8/31/78:	744,834
Children's Bureau, 7/1/67 - 9/30/70:	225,441

Funded also by nine non-federal sources, 1970-1979.

IV. YEARS OF PROGRAM DEVELOPMENT: 1965-1978

The MCHP was a pioneer among home based programs. It was developed by 1968 in its current two-year format, but formative and summative evaluation continues yearly. "MCHP" in this Submission will always refer to the two-year format of the program.

V. BRIEF DESCRIPTION OF PROGRAM:

A. What is the Mother-Child Home Program?

The MCHP is a voluntary, home-based early education program for low-income pre-preschoolers and their mothers. The word "mother" is used generically for any adult who has a primary nurturing and enduring relationship with the child. The program of 92 home sessions, spaced over 2 local school years, is explicitly addressed to mother and child as a socially interactive dyad.

B. Specific program goals.

- 1) Foster mother's positive interactive behavior with her child.
- 2) Enhance child's cognitive development.
- 3) Enhance development of child's social-emotional competence.
- 4) Increase child's chances for normal academic reading achievement.
- 5) Increase child's chances for normal academic arithmetic achievement.

C. Intended users and beneficiaries.

The MCHP is for the use of schools and other service agencies. Intended beneficiaries are mothers and children from low income groups.

D. Population sample on which the MCHP was developed and tested.

The MCHP was developed and tested by the Verbal Interaction Project (VIP) with a total of 653 children divided among 10 yearly cohorts of low income pre-preschoolers in mother-child dyads entering the VIP from 1967 through 1977, after a pilot study in 1965. The dyads lived in "poverty pockets" of suburban Long Island and were almost all socially defined as Black, with a few Hispanic dyads.

Data for two major subgroups of this total of 653 dyads will be presented in this Submission: short-term data (pre and post-Program) on the cohort of 55 subjects who entered in 1976 and were posttested after completing two years in the Verbal Interaction Project by May 1978; and longitudinal data on 6 groups of 129 subjects who had completed 3rd grade by June 1978 and had entered the VIP between 1967 and 1972.

The 1976 cohort was chosen as one major subgroup for presentation in this Submission because this group's short term data was studied in the VIP's most recent true experimental research design. Also, the design was suggested by Dr. Donald T. Campbell of Northwestern University in consultation in January 1976, as a possible solution to problems in the VIP's previous experimental research. The new design was a true experiment which controlled not only for sample bias through randomization of subjects but also for the "John Henry Effect": the possible influence on outcomes of Control (non-MCHP) mothers knowing of the MCHP and

putting extra effort into their parenting to compete with the program's influence. This effect seemed to be successfully counteracted by the design suggested by Dr. Campbell for the 1976 cohort. This required first identifying all dyads eligible to be VIP subjects within a group of 113 who had volunteered to have their two-year-olds participate in an Early Screening Program conducted by one of the VIP's sponsors, a family-service agency. Criteria for subject eligibility were: parents not above 12th grade or semi-skilled occupation (except for absent fathers); child testable in English; eligibility for low-income housing; residence in rented housing; no previous direct or indirect VIP contact. The Early Screening Program consisted of three successive examinations to evaluate the child's speech, hearing, vision, and cognitive development. The first screening evaluation was in Fall, 1976; the second was in Spring, 1977; and the last was in Spring, 1978. Of the 113 children in the Screening, 71 were found to be eligible as VIP subjects. They were randomized into Control and Experimental groups at the time of the first screening. The Control Group contained 35 randomly assigned children and their mothers who did not know of the MCHP's existence. The remaining 36 randomly assigned children and their mothers were in the Experimental Group and were to be invited into the MCHP (whose budget would permit only a limited number of new entries). One Experimental mother moved from the area immediately after pretest (first Screening). The remaining 35 were invited into the MCHP, and all accepted (100%). Overall subject attrition from pretest to posttest two years later was 23%: 26% from the Controls and 19% from the Experimental (MCHP) Group. It can be seen from Table 1 below that both E and C subjects in the 1976 cohort were closely similar in demographic characteristics typical of low income families:

Table 1: Demographic Characteristics of 1976 Subjects at Entry into the VIP (cell calculations based on Child N unless otherwise specified)								
Child			Father			Mother		Family
N	Age	% Male	Years of School	Occupation: Semi-skilled or below	% Always Present	Years of School	% Rec'd. Welfare	Number of Children
Experimental Group: Mother-Child Home Program								
29	2	44.8	11.3 (N=22)	62.0 (N = 21)	24.1	11.21	65.4	1.86
Control Group: No Program								
26	2	38.5	11.3 (N=19)	82.3 (N = 17)	15.4	11.31	69.2	1.73

Former MCHP and Comparison children who had completed third grade were chosen as the other major subgroup, for presentation of their longitudinal outcomes through third grade, in which performance probably demonstrates the lasting effects of early intervention since it is a major predictor of later school performance. The 129 children in the three MCHP Groups and three Comparison Groups which had passed through third grade by June 1978 had entered the VIP during the period from 1967 through 1972, when the research design for studying the MCHP was quasi-experimental. However, the groups were sufficiently similar in low-income characteristics to support strongly the reliability of the comparison, as indicated by Table 2 on page 3. The Ns in Table 2 are of children available for evaluation at 3rd grade. The 78 children in the three MCHP Groups in Table 2 all entered the VIP at age 2: 24 in 1968, 25 in 1969, and 29 in 1970. The 51 children in the three Comparison Groups in Table 2 entered the VIP for evaluation at varying ages: 14 at ages 2 and 3 in 1967 (from a town 18 miles away from the MCHP Groups); 10 at age 4 in 1967 (older siblings of 10 children who entered a pilot version of the MCHP in 1967); and 27 at age 6 in 1972 (children who had had no previous contact with the VIP and were in first grade contemporaneously with the T-68 MCHP Group in Table 2).

Table 2: Demographic Characteristics of Children in Longitudinal Study
at Entry into VIP*

		Child			Father			Mother		
Entry Year	Treatment Group	N	Age	% Male	Years of School	% Occup. 6 of 7 ^a	% Always Present	Years of School	% Rec'd. Welfare	No. of Children
Experimental Groups: Mother-Child Home Program										
1968	T-68	24	2	41.7	10.5 (N=23)	71.4 (N=21)	58.3	10.5	37.5	2.8
1969	T-69	25	2	52.0	11.2 (N=20)	68.2 (N=22)	62.5 (N=24)	10.3 (N=24)	44.0	2.4
1970	T-70	29	2	55.2	9.9 (N=28)	85.7 (N=28)	75.9	10.3	24.1	2.6
Comparison Groups: No Program										
1967	C ₂ -67	14	2+3	78.6	10.3	78.6	92.9	11.1	7.1	2.4
1967	C ₄ -67	10	4	50.0	10.3 (N=9)	71.4 (N=7)	20.0	10.6	60.0	3.4
1972	C ₅ -72 ^b	27	6	48.1	9.6 (N=18)	100.0 (N=9)	25.9	10.2	80.0 (N=25)	3.0

* Unless otherwise specified, cell calculations are based on the Child N for the group.

^a Hollingshead scales 6 or 7 (unemployed, unskilled, semi-skilled); including available data for absent fathers not meeting entry occupational criteria.

^b C₅-72 entered in 1972-1973 as after-only group.

The low overall subject attrition, from pretest to third grade, of 21% adds to the data's reliability. For the 129 in third grade, 163 had entered. The attrition for the combined MCHP Groups was 24% (78 remaining from 102 at entry). The attrition for the combined Comparison Group was 16% (51 remaining from 61 at entry).

E. Salient features of the Mother-Child Home Program.

The theory underlying the Mother-Child Home Program is that conceptual-cognitive and social-emotional growth can be built on the child's exchange of language (symbols for experiences and concepts) with enduring family figures with whom there is a close affective bond, around verbally stimulating, intrinsically interesting materials. Newer home based programs have borrowed from the pioneer MCHP, but some features still seem to be unique to the MCHP:

- 1) an explicit, written, non-didactic two year method aimed to be independent of special staff skills or charisma;
- 2) an explicit, written curriculum in small, comprehensible bits;
- 3) home visitors trained to model interactive techniques, and not to teach or counsel;
- 4) permanent assignment over the two years of 22 toys and 24 books, as curriculum materials; and
- 5) explicit techniques to protect against the Program's possible intrusiveness.

The mother-child dyad is in the MCHP for two school years, starting when the child is about age 2 and continuing until he or she is about age 4. The Program's half-hour Home Sessions occur twice a week for 7 months in each of 2 years, following the local school calendar, for a maximum of 46 visits each year. The number of visits are varied in the

second year to accommodate to the mother's changing life situation (e.g., new job, hours). A home visitor called a "Toy Demonstrator" visits mother and child together. Without direct teaching, she models for the mother techniques that the mother can use with her child in play around colorful, progressively complex curriculum materials: commercially available toys and books selected to stimulate verbally interactive behavior. The books and toys are called Verbal Interaction Stimulus Materials, or "VISM", and there is one for each of the 23 weeks of the Program in each of the two years. The VISM are permanently assigned to the child, for continuing stimulation of verbal interaction and as a bridge to school experience.

The Toy Demonstrators are paid or volunteer women who need have no previous work experience nor education beyond high school. They learn their Program skills from a college educated Program Coordinator in an initial 8-session Training Workshop, then in weekly groups and in less frequent individual conferences. A major precept is that they must stay within the limited Toy Demonstrator role and not attempt to teach or counsel at any time.

The program's curriculum is a fun oriented, developmentally appropriate Guide Sheet for each VISM. The core of all 46 Guide Sheets is exactly the same. The core element is a list of concepts (e.g., colors, shapes, sizes) and cognitively related behaviors (e.g., matching, choosing, pretending) concretized by examples taken from the book or toy for which the Guide Sheet was written. The Guide Sheet is addressed to the Toy Demonstrator but is also given to the mother, to use for reference as she wishes.

Data were collected through methods of process research, and for supervisory reasons, to assure that the program as implemented was the one outlined in the research plan, and that quality was maintained throughout. Records of these data are available at the VIP for review. For example: anecdotal notes and some quantitative data were required from every Toy Demonstrator for every Home Session; Home Sessions were discussed at weekly group conferences with the Program Director; parents gave feedback to the Director in three widely spaced interviews a year and through signing for each new VISM; Home Sessions with every dyad were monitored through twice-yearly audio-tape recordings; and the Program Director presented bi-weekly oral reports to the VIP staff and to the VIP Director (principal investigator), incorporated into written minutes.

F. Claims of effectiveness for the Mother-Child Home Program

- 1) Relative to true randomized controls, MCHP mothers will demonstrate more positive and verbal interactive behavior with their children.
- 2) Relative to true randomized controls, MCHP children's IQ level will be significantly higher immediately after the MCHP.
- 3) Relative to similar comparison children, MCHP graduates when they reach third grade will be significantly superior in reading achievement, as well as in post-MCHP IQ.
- 4) Relative to similar comparison children, MCHP graduates when they reach third grade will be significantly superior in arithmetic achievement, as well as in post-MCHP IQ.
- 5) Relative to similar comparison children, MCHP children in an out-of-project replication will have a significantly higher IQ immediately after the MCHP.

It is also claimed that these effects will be educationally meaningful, and that the MCHP will be acceptable to the target population, generalizable to other settings, and of relatively low cost.

VI. EVIDENCE OF EFFECTIVENESS

A. Mothers' post-program positive verbal interactive behavior

1) Evidence of MCHP impact on mother's interactive behavior: At post-program evaluation, 48 mothers of the 55 1976 children who were posttested consented to being video-taped for ten minutes of interaction with their children focused around a standard play situation. On a program-referenced, VIP-developed instrument, "Maternal Interactive Behavior" (MIB), the MCHP mothers were found to be significantly more positively interactive with their children than the controls, with a total MIB score of 266.6 as compared to 156.5 for the

controls. Table 3 below shows the MIB scores for the groups. It contains both Item and Total raw scores:

Table 3: Maternal Interactive Behavior (MIB) Scores, 1976 MCHP & Control Groups

Var- iable	Item 1 Gives Labels	Item 2 Gives Colors	Item 3 Describes Actions	Item 4 Gives Numbers, Shapes	Item 5 Gives inform- ation	Item 6 Praise	Item 7 Aids diver- gence	Item 8 Smiles	Item 9 Replies to Child	Item 10 No Reply	Total Posi- tive Score
Experimental Group; Mother-Child Home Program											
Mean	37.24	17.88	95.00	18.48	20.68	9.76	15.76	8.48	54.92	11.60	278.20
S.D.	19.68	12.72	27.07	16.96	12.92	6.15	17.76	5.80	20.65	7.33	87.85
N	25	25	25	25	25	25	25	25	25	25	25
Control Group: No program											
Mean	17.96	20.00	67.83	6.26	11.65	6.04	4.78	5.09	34.87	18.00	174.48
S.D.	7.58	19.52	27.95	7.25	12.57	5.71	6.40	6.32	15.81	11.25	75.25
N	23	23	23	23	23	23	23	23	23	23	23

The raw scores in Table 3 are means of the actual frequencies of the mothers' behavior categorized in each Item. The "total MIB score" is the "total positive score" (sum of Items 1-9) minus the score for Item 10, the only "negative" score. The differences between the MCHP and Control group appeared in mothers': verbalizing labels, actions, numbers and shapes, and information; stimulation of divergence; replies to child; smiles or other positive gesture; and vocalizes praise.

2) Interpretability of the MIB as a measure: For inter-rater reliability, Pearson's r was calculated, in a previous MIB study (Spring, 1976), between the scores of each of 2 raters in 2 teams of raters. Correlations were .95 (N 39) and .96 (N 44) respectively, indicating high levels of agreement between raters on each team. Validity was indicated by the MIB's correlations of .54 (N 18) with Toy Demonstrator ratings of mothers' Home Sessions behavior, independent of the MIB ratings; a .23 (N 83) correlation with children's concurrent IQ scores. Both correlations were statistically significant ($p < .05$). These correlations are to be logically expected, since the MIB rated mainly program-referenced maternal behaviors.

3) Credibility of MIB effects evidence: MIB raters of the videotapes were kept blind to dyads' treatment status. The MIB videotapes and MIB protocols can be viewed at the VIP for secondary analysis.

4) Evidence of statistical reliability of MIB effects: The "total MIB scores" for MCHP and control mothers were examined in a factorial analysis of variance. The mean difference of 110.12 points in favor of the program mothers was significant at the $p < .01$ level, $F(1,40) = 18.59$.

5) Evidence of educational meaning of MIB effects appears in two kinds of correlations: (1) the significant correlation ($p < .05$) between the mothers' MIB scores and the children's concurrent IQ scores at child's age four, since IQ at age four is one predictor of school performance; and (2) the significant correlation with their mothers' MCHP Home Session behavior (as measured on "PACT" described below, and shown above to be significantly correlated with the mothers' MIB scores) of MCHP graduates' 1st grade IQ (.48), arithmetic achievement (.46); and teachers' ratings of: reality recognition (.49), creativity (.44), mastery of new tasks (.33), and freedom from serious academic problems (.41).

6) Evidence of attributability of MIB effects to MCHP: Experimental (MCHP) and Control group equivalence resulting from the true experimental design tends to assure that the Mother-Child Home Program caused the effect on the program-specific maternal interactive behavior. Further, the MIB play situation, materials, locale and presence of the video camera were all equally strange to both Experimental and Control dyads. It is not known to what degree mothers' MIB behavior reflected their actual home behavior, but the significant correlation between MIB scores and MCHP mothers' Home Session behavior suggested that it did so. (MCHP mothers' Home Session behavior early and late in the program was measured independently by two different Toy Demonstrators, using a VIP, developed

internally reliable instrument called "Parent and Child Together" or PACT. The MCHP mothers showed significant improvement, $p < .01$, but since the same kind of home-based data could not be collected for Control mothers, the PACT data do not qualify as evidence of MCHP impact).

B. Children's post-program cognitive status

1) Evidence immediately after the program of MCHP impact on cognitive development:

The Stanford-Binet IQ at posttest and the Cattell IQ at pretest were used as measures of the MCHP's cognitive impact because, in spite of its many flaws, "IQ" has been found to correlate with school success in other studies and in our own. The cognitive development of all the children in the 1976 cohort was measured before the Experimental (MCHP) Group's entry into the MCHP in Fall, 1976, when the children were two years old (27 months) by Cattell IQs, and again almost two years later, in Spring 1978, when the children were four (48 months), by Binet IQs. For the 55 children available for posttesting, a two point difference in the mean pretest IQ favored the Experimental Group. A 5.95 posttest IQ difference favored the Experimental (MCHP) Group at posttest. The post-program IQ of the Experimental Group was 107.03, as compared to 101.08 for the Control Group. The post-program IQ difference between E and C groups was found to be statistically significant even when adjusted for the difference in pretest IQs, resulting in a corrected difference of 4.55 IQ points. This unequivocal post-program cognitive effect in a true experimental design was consistent with those achieved annually in quasi-experimental designs from 1967 through 1972.

Table 4 below summarizes the IQ scores for the 1976 cohort:

Table 4: Pretest and Post-Program IQs for 1976 Experimental and Control Groups				
Treatment and Variable		Pretest Cattell IQ	Post-program Stanford-Binet IQ	Post-program Binet IQ adjusted for pretest IQ
Experimental Group:				
Mother-Child Home Program	Mean	96.10	107.03	106.37
	S.D.	10.00	10.41	
	N	29	29	29
Control Group:				
No Program	Mean	94.00	101.08	101.82
	S.D.	9.27	9.61	
	N	26	26	26

2) Interpretability of post-program cognitive measures: The Cattell Infant Intelligence Scale (1940; last reprint, 1975), used for pretest, and the Stanford-Binet Intelligence Scale (1960 edition), used for posttest, are both widely used standardized measures, with reliability and validity long established. The use of these editions of both measures was necessitated mainly by the compatibility requirements of comparing the 1976 cohort's data with those of earlier cohorts.

3) Credibility of post-program cognitive effects evidence: The post-program cognitive evaluations were done by staff psychologists. The scores were processed and analyzed by research staff of the VIP. The psychologists were kept blind to the treatment status of the children, through elaborate procedures developed, refined, and regularly used in the VIP's yearly pre, post, and follow-up testing. Their chief features were: randomization of E and C subjects in the evaluation appointment sequence; withholding of all information except child's name and birthdate from the psychologists; and transportation of all dyads to the evaluation site by staff who were equally strange to both E and C subjects, as was the test site. The research staff members who processed and analyzed the IQ data could not be "blind". However, the variability of the outcome data over many years argues against bias of the data in either positive or negative direction.

Like all VIP data, the IQ data are available for secondary analysis in four sequential formats: raw; coded on data schedules; keypunched on IBM data cards; and entered on computer tape and disc.

4) Evidence of statistical reliability of post-program cognitive effects: Post-program Binet IQ scores for MCHP and control children were examined in an analysis of covariance, using pretest IQ as a covariate. The post program adjusted difference of 4.55 points in favor of the program children was significant at the $p < .05$ level, $F(1,46) = 4.36$.

5) Evidence of educational meaning of post-program cognitive effects: The adjusted 4.55 point difference in the post-program mean IQs of the MCHP and control children favored the MCHP children by almost one-third of the Stanford-Binet's standard deviation. This is an educationally meaningful as well as statistically significant difference between the two groups.

6) Evidence of attributability of post-program cognitive effects to Mother-Child Home Program: Experimental and Control Group equivalence resulting from the true experimental design provides good assurance that the Mother-Child Home Program caused the significant effect on the cognitive development of the children in the Experimental Group. Further, the non-test behaviors as measured by the Bayley Infant Behavior Record (IBR) within the posttest situation were clearly similar for both Experimental (MCHP) and control children, suggesting that the IQ differences were not attributable to the child's reaction to the test situation. The IBR was broken into three subscales derived from a principal components analysis: (1) activity score, (2) social-emotional score and (3) task orientation score. On the activity score the means of the MCHP and Control Groups were 34.83 and 33.12 respectively. On the social-emotional score the means of the two groups were 13.79 and 12.42. Finally, on the task orientation score the MCHP children scored 18.62, and the control children 18.69. This indicates no advantage for the program-experienced Experimental children in the program-like test situation.

C. Children's longitudinal cognitive, academic, and social-emotional development

1) Evidence in third grade of MCHP impact on cognitive, academic, and social-emotional development: By the end of the 1976-1977 school year, six groups of VIP children had completed third grade. Three were Experimental Groups made up of children who had graduated from the MCHP in three successive years -- 1970, 1971, and 1972 -- having each entered the MCHP two years previously, in 1968, 1969, and 1970. The other three were Comparison Groups, composed of children who had not received the Mother-Child Home Program, were demographically similar to the Experimental Groups, and had entered the VIP as "evaluation only" subjects in 1967 and 1972. All six groups are described demographically in Table 2 above. However, Group C₅-72 was omitted from all data analyses as having had less preschool, center-based experience of any kind than all other groups.

Cognitive Development: Consistent with the short-term IQ differences described above in VI-B for the 1976 cohort, there were Binet IQ differences immediately after the MCHP favoring the MCHP children within the six groups included in the third grade follow-up study. The MCHP Group mean IQ was 105.74, and the Control Group mean IQ was 94.82, a difference of 10.92 IQ points found significant in a hierarchical analysis of variance at $p < .01$ level, $F(1,63) = 14.41$. The third grade cognitive development of the six groups was measured by IQ based on the Wechsler Intelligence Scale for Children (WISC). The combined mean IQ of the three Experimental Groups of MCHP graduates was 100.17. The combined mean IQ of the C₂-67 and C₄-67 Comparison Groups was 96.41. The 3.76 point IQ difference favored the MCHP graduates. If Comparison Group C₅-72 had been included with the other combined Comparison Groups, the Comparison Groups' IQ would have been 95.02, a difference of 5.15 IQ points from the MCHP graduates' IQ of 100.17.

Reading Achievement: The third grade reading achievement of the six groups was measured by the reading subtest of the Wide Range Achievement Test (WRAT). The combined mean standard reading score of the three groups of MCHP graduates was 99.87, meeting the national mean of 100 on this subtest (Schaie and Roberts, 1970). The combined mean standard reading score for the Comparison Groups was 90.18, 9.82 points below the national mean and almost the same amount below the score of the combined MCHP groups.

Arithmetic Achievement: The third grade arithmetic achievement of the six groups was measured by the arithmetic subtest of the WRAT. The combined mean standard arithmetic score of the three groups of MCHP graduates was 101.91, slightly surpassing the national mean of 100 on this subtest (Schaie and Roberts, 1970). The combined mean standard arithmetic score for the Comparison Groups was 91.64, 8.36 points below the national mean and 10.27 points below the score of the MCHP groups.

Social-emotional Competence: The third grade social-emotional competence of the six groups was measured by the Child's Behavior Traits (CBT), a VIP developed instrument. The combined mean total CBT score of the MCHP graduates was 63.40, 5.14 points higher than that of the Comparison Groups.

Table 5 below details the pre, post-program, and third grade scores of the six groups for IQ, academic achievement, and social-emotional competence.

Table 5: IQ, Academic, Social-emotional Scores for MCHP & Comparison Children in 3rd Grade								
Entry Year and Variable	Entry IQ (& Entry N)		Post-MCHP Stanford-Binet (or WISC) IQ ^a	Third Grade Scores				
	Cattell	Stanford-Binet		WISC IQ	WRAT Reading	WRAT Arithmetic	CBT Social-Emotional	
Experimental Groups: Mother-Child Home Program								
1968 (E-68)	N	13(15)	11(13)	19	24	24	24	24
	Mean	88.4	91.3	109.0	103.0	101.7	99.8	72.0
	S.D.	12.2	3.7	8.6	10.9	14.9	13.7	18.3
	Age	2	2	4	8	8	8	8
1969 (E-69)	N	25(31)	0(2)	21	25	25	25	23
	Mean	85.5		103.7	98.3	97.8	99.9	60.4
	S.D.	9.8		11.3	8.0	12.4	10.2	13.1
	Age	2		4	8	8	8	8
1970 (E-70)	N	29(41)	0(0)	23	29	29	29	28
	Mean	88.6		107.2	100.8	101.7	104.8	61.9
	S.D.	8.6		12.3	10.7	11.6	8.3	21.9
	Age	2		4	8	8	8	8
Comparison Groups: No Program								
1967 (C ₂ -67)	N	9(12)	5(7)	14	14	14	14	14
	Mean	93.4	88.0	96.3	96.1	87.4	90.1	58.4
	S.D.	8.0	10.3	11.8	15.0	17.3	17.4	13.5
	Age	2	3	4,5	8,9	8,9	8,9	8,9
1967 (C ₄ -67)	N	No pre-MCHP IQ.		10(10)	10	10	10	
	Mean	IQ at entry into VIP,		91.0	96.3	91.1	91.4	No
	S.D.	at age 4, is in next		8.2	10.3	13.3	13.0	Data
	Age	column (post-MCHP IQ).		4	8	8	8	
1972 (C ₅ -72)	N	No pre-MCHP IQ.		27(30)	27	27	27	27
	Mean	IQ at entry into VIP,		90.7(WISC)	93.9	90.5	93.7	62.8
	S.D.	at age 6, is in next		11.3	8.7	15.7	9.9	22.4
	Age	column (post-MCHP IQ).		6	8	8	8	8
^a Some subjects in some groups not available.								

^aSome subjects in some groups not available.

2) **Interpretability of third grade measures:** The WISC (1949 edition) and the WRAT are widely used standardized measures, with well established reliability and validity. To avoid the problems of using the grade-equivalent WRAT norms included in the WRAT manual, the VIP adopted the age-based norms developed by Schaie and Roberts from a large stratified national sample of approximately 7000 children aged six to eleven years (1970).

The CBT was made up of 20 Likert-scale items yielding a summative score from 20 to 100, with the higher direction indicating higher social-emotional competence, from age two to age ten. The coefficient alpha for its internal reliability was .95 (N 390). Validity

was indicated in three ways: 1) the negative correlations of $-.70$ ($N\ 175$) between CBT score and children's school problems indicated by the same teachers who scored the CBT; 2) the positive correlation of $.580$ and $.577$ respectively between math teachers' CBT scores and classroom teachers' indication of school problems, and vice versa ($N\ 59$); and 3) the positive correlation of $.43$ between CBT score and IQ ($N\ 273$). Details are in Levenstein, 1976.

3) Credibility of third grade cognitive, academic, social-emotional effects: Cognitive and academic data were collected and processed at the VIP under the same conditions protecting against bias described in Section VI-B-3 on page 6.

The social-emotional data were collected from the children's classroom teachers, who were blind to their pupils' treatment status although they might guess that the children were former VIP subjects.

4) Evidence of statistical reliability of third grade cognitive, academic, and social-emotional effect: The differences in these data between MCHP and comparison children were tested in a hierarchical analysis of variance. In all ANOVAS, differences between groups receiving the same kind of treatment were small enough to permit pooling of group variance with within-cell variance. The effects for 3rd grade reading achievement were significant whether data were pooled, $F(1,73) = 8.17$, $p < .01$, or not pooled ($1,3$) = 22.93 , $p < .05$. So were effects for arithmetic achievement whether data were pooled, $F(1,73) = 10.53$, $p < .01$, or not pooled, $F(1,3) = 15.58$, $p < .05$. The effects for social-emotional competence, with only one C group for comparison, were not significant $F(1,61) = < 1$. Third grade WISC IQ differences were also not significant, $F(1,73) = 1.72$, when Comparison Group C5-72 was omitted from the conservative analysis, by the reasoning indicated in VI-C-1 on page 7. However, if the C5-72 Group had been included in the Comparison Group data, the mean difference of 5.15 IQ points in favor of the MCHP Group (MCHP mean IQ = 100.17; Comparison mean IQ = 95.02) would be statistically significant at the $p < .05$ level: $F(1,4) = 11.68$; or when pooling error terms, $F(1,100) = 5.95$.

5) Evidence of educational meaning of the third grade cognitive, academic, and social-emotional effects: The difference between the mean reading achievement scores of MCHP graduates and comparison children, in favor of the program graduates, was educationally as well as statistically significant. The 9.7 point difference was almost 2/3 of the WRAT's 15 point standard deviation. The same was true of the 10.3 point difference between the groups in their WRAT arithmetic scores. Further, the reading and arithmetic scores of the MCHP graduates reached the national WRAT means, in contrast to those of the comparison children, which were close to the means for the low-income population (Schale and Roberts, 1970).

6) Evidence of attributability of third grade cognitive, academic, and social-emotional effects to MCHP: Although the quasi-experimental research design in which the third grade children were studied was not so rigorous as the 1976 cohort's true experimental design, the third grade Experimental (MCHP) and Comparison Groups were demographically so similar as to be comparable to each other. Their low income characteristics were also typical of the target population. The weight of the evidence favors the attributability of the significant third grade effects to the Mother-Child Home Program, as was noted about kindergarten IQ effects of the MCHP in Madden, Levenstein, and Levenstein (1976). All data collected by the VIP on its 653 subject-dyads over the 14 year period since its inception in 1965 either significantly demonstrated Program effects or indicated trends in that direction. For example, significant effects were found in comparisons of siblings' cognitive development: 1) at age four, between Program graduates and older siblings who had not had the MCHP; and 2) at age two, between the entry IQs of children who had had the MCHP and those of their younger siblings who had not yet entered the program but had had parenting by program-experienced mothers.

D. Acceptability and generalizability of the Mother-Child Home Program

Acceptance by Target (low income) Population

Fourteen years of enthusiastic Program acceptance indicated by anecdotal evidence and reports from parents is represented quantitatively by: 1) very high Program entry acceptance rates by the target population, 85% to 100% in the VIP program and in replications outside of the VIP; 2) very high proportion of Home Session appointments kept, 85% annually; and 3) low average attrition rates of about 5% during the first year and a total of 25% by the end of the second Program year, in six years of quasi-experimental research.

Generalizability to other Settings

The VIP has guided, through its Demonstration Center, 70 replications of the MCHP in 16 states and in Bermuda. The purpose of the replication has been research of the Program's feasibility, effectiveness, social desirability and cost in non-VIP settings and with non-VIP low income populations. The latter have been urban, rural, suburban; and Black, White, bilingual, Native American. The VIP has certified 29 replications as having fulfilled basic standards for two years. All replications are required to return demographic and process data to the VIP. Many also return outcome IQ data, which, on an average, support the VIP's. For example, a school-sponsored replication in Manhasset, New York, demonstrated a statistically significant IQ superiority of 5 combined years of MCHP graduates to a similar comparison group (101.25 as compared to 94.0), a difference significant at the $p < .05$ level.

VII. COSTS FOR ADOPTION AND MAINTENANCE OF THE MOTHER-CHILD HOME PROGRAM

In a 1974-1975 study, 13 replications, serving a total of 510 dyads, reported the average cost per dyad as \$688.55 for all expenses, including salaries and curriculum materials. The range was from \$250 to \$1787, depending mainly on salaries. Omitting salaries (which are locally determined), the per dyad annual costs are as follows:

	Installation, first 2 years (30 dyads, Year 1; 60, Year 2)	Subsequent years, recurring costs (60 dyads)
Staff training	\$33.33	(\$3.33, optional)
Curriculum materials (toys & books)	100.00	100.00
Other (telephone, travel, etc.)	10.00	10.00
	<u>\$143.33</u>	<u>\$110.00 (or \$113.33)</u>

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